Market Risk Economic Capital

Market Risk EC

Introduction

- Financial business is exposed to many types of risk due to the nature of business.
- To guard against the risk, financial institutions must hold capital in proportion to the potential risk.
- Market risk economic capital is intended to capture the value change due to changes in market risk factors.

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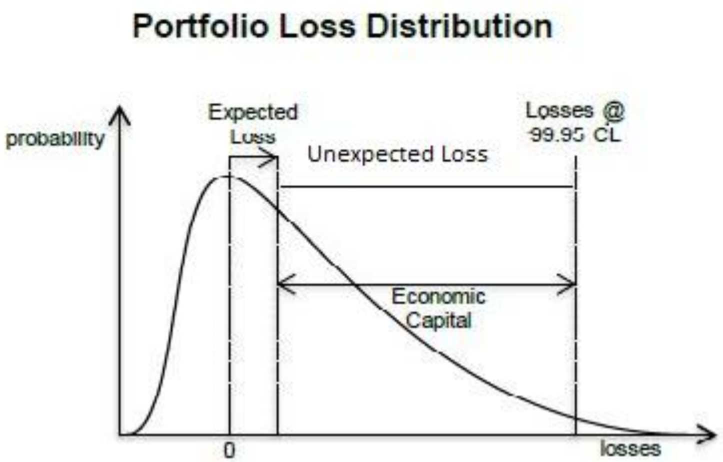
Economic Capital (EC) Definition

- Economic loss is the loss in economic due to market movement.
- Economic Capital is intended to cover unexpected losses rather than expected loss, illustrated as follows.



Economic Capital vs Regulatory Capital

- Economic Capital (EC)
  - Economic Capital is an internal measure for internal risk control purpose.
  - Economic Capital is statistically measured for 1-year time period at 99.95% confidence level (consistent with the probability of default (0.05%) targeted by most institutions)
- Regulatory Capital (RC)
  - Regulatory Capital is an external measure used by regulators.
  - Regulatory Capital is statistically measured for 10-day time period at 99% confidence level

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Economic Capital Calculation

- Economic Capital falls into the category of Value at Risk (VaR) measures as both try to capture value change due to market movement.
- VaR system computes the market risk of 1-day time period at 99% confidence level, while EC measures the market risk of 1-year time period at 99.95 confidence level
- Scaling methodology is the key to compute economic capital, i.e., scaling from 1-day to 1-year and from 99% to 99.95%

Economic Capital Scaling Methodology

- Time horizon Scaling: scaling 1-day VaR to 1-year VaR
  - The simplest and most commonly used approach is

    VaR (1-year, 99%CL) = $\sqrt{T}$ * VaR(1-day, 99%CL)

    where T = 365 for calendar days or T = 250 for business days and CL = confident level.
  - Assumptions of this scaling formula
    - 1-day loss distribution is independently and identically distributed (IID)
    - Constant mean and volatility
    - No autocorrelation
  - Comments: This approach is very simple and intuitive but most likely under-estimates risk as the assumptions don’t match realty.

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Economic Capital Result

- Final economic capital:

EC = VaR (1-year, 99.95%CL) = K $*\ \sqrt{T}\ *$ = K*$\sqrt{T}$ * VaR (1-day, 99%)

where VaR includes general VaR, equity specific VaR, debt specific VaR.

Banks are required to establish and maintain a Board-approved definition of materiality to assess modifications to regulatory capital models. The definition of materiality should reflect the Bank's view of what constitutes a material change, must include quantitative and qualitative factors, and meet FRB's principles. Banks are required to establish and maintain a Board-approved definition of materiality to assess modifications to regulatory capital models. The definition of materiality should reflect the Bank's view of what constitutes a material change, must include quantitative and qualitative factors, and meet FRB's principles.

Thanks!

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